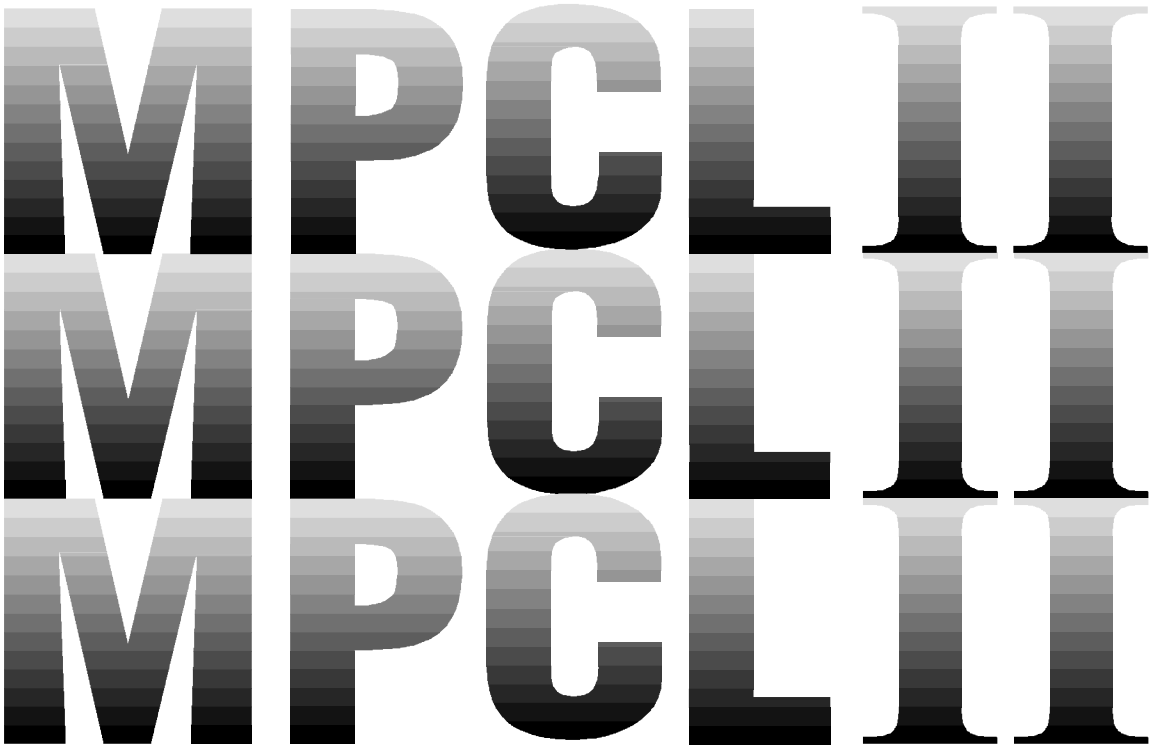
Monarch®

PAXAR

MONARCH® PRINTER CONTROL LANGUAGE *II*

Graphics Manual



TCMPCL2GR Rev. AA 9/00

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Preface

Before you read this manual, review the information in your printer's *Packet Reference Manual.*

About This Manual

This manual provides information on how to create graphic packets for all Monarch® printers that support Monarch Printer Control Language (MPCL or MPCLII).

Chapter 1	Provides a basic overview of creating graphics.
Chapter 2	Explains how to map out the graphic image using the Hex or Run Length method.
Chapter 3	Explains how to create a graphic packet using Graphic Header, Bitmap, Duplicate, Next-Bitmap, Text, Constant text, Line, and Box Fields.
Chapter 4	Explains how to place a graphic image into a format.
Appendix A	Contains the conversion charts for Binary to Hex and Run Length**.**

Audience

This manual is for the programmer who creates graphic packets and is familiar with Binary and Hexadecimal numbers.

Terms To Know

Bitmapped Images	These images are formed through a series of dots.
Compliance Labels	These are shipping labels used exclusively for a certain retailer. The label complies with the retailer's standards.
Compliance Label Overlay	This is the "skeleton" of the compliance label that contains the fixed fields (constant text, lines, etc.).
Field	This can be bitmap, next-bitmap, duplicate, text, non-printable, graphic, bar codes, lines, or boxes. It is the result of a field definition.
Field Definition	Any string of elements pertaining to one field. A field definition begins with a field identifier (such as B for bitmap or D for duplicate).
Format	This is the layout or design for your supply.
Format Packet	This is a packet that creates the format. Refer to the definition of Packet for more information.
Graphic Field	This field is specified in the format packet. The values for *row* and *column* position the graphic image on the supply.
Graphic Packet	This is a packet that creates a graphic bitmap image or a compliance label overlay. Refer to the definition of Packet for more information.
Graphic Header	The first line of the graphic packet, immediately following the start of packet ({). A graphic header must begin with G, followed by various graphic elements.
Packet	This is any string of characters contained within ({ }).

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Chapter 1. Introduction

You can use graphic packets to create

- Compliance Labels.
- Bitmapped images.

This chapter gives an overview of both approaches. To include a graphic packet within your format, your format **must** contain a Graphic Field. Refer to Chapter 4, “Placing the Graphic in a Format,” for more information.

Overview of Compliance Labels

You can create compliance labels by using a graphic packet for the fixed fields and a format packet for the variable fields of your compliance label. The fixed fields of a compliance label are composed of text, lines, or boxes, which are repeated on each label. The variable fields are composed of text, bar codes, and order information, which change with each label. Using a graphic packet for the fixed fields saves time, because the printer does not have to image all the lines or boxes each time the compliance label is printed.

Also, using a graphic packet for a compliance label reduces the number of fields in your format. Formats have a maximum number of fields per packet (**0-99**). However, you can bypass that requirement by placing your compliance layout in a graphic packet. When you process your formats, you only need one line to call the graphic packet.

The following example shows how to call a graphic packet from within a format packet.

```
{                              Start of Packet
F,1,A,R,E,400,400,"RDCI"¦      Format Header
G,57,0,0,0,0¦                  Call the graphic packet
.                              variable information
.                              variable information
}                              End of Packet
```

Once you have your compliance label format set up, all you need to do is add the variable sections (bar codes, addresses, and order information) to the format packet.

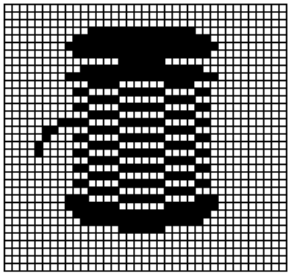
To see a sample compliance label graphic packet, refer to Chapter 3, "Creating a Graphic Packet." To see a sample compliance label using a graphic packet within a format, refer to Chapter 4, "Placing the Graphic in a Format."

Overview of Bitmapped Images

A printed image is formed through a series of dots. Each square on the grid below represents a dot on the printhead. The graphic image is created by blackening dots in a specific pattern.

You can print varying shades of gray according to the concentration of dots on the image.

When the dots are printed together, the end result is a graphic image.



Determining a Method

You can use one of two methods to map out your graphic image:

Hexadecimal Method
The dot sequences are segmented into Binary numbers, and then converted to Hexadecimal numbers.

A graphic using gray-scaling, several slanted lines, or several vertical lines typically translates more efficiently with Hex Representation.

Run Length Encoding Method
The dot sequences are segmented into black and white strings within a row. The total count of each white string is converted to a lowercase letter, corresponding to numeric value. The total count of each black string is converted to an uppercase letter, corresponding to numeric value. This method is more complicated, but can reduce imaging time for graphics that contain repetitive rows of dots.

A graphic with horizontal lines or very few white-to-black borders typically translates more efficiently with Run Length Encoding **.**

The most efficient encoding method depends on how complicated your graphic image is and whether or not imaging time is a concern. You may want to experiment with both encoding methods to get optimal performance.

Chapter 2. Designing the Graphic Image

This chapter describes

- how to design compliance labels.
- how to design bitmapped images.
- special considerations.
- how to map out the graphic image by the Hex and Run Length methods.
- how to store the graphic image.

The information presented in this chapter deals with Binary and Hexadecimal numbers. Appendix A, “Conversions Charts,” contains the following charts:

- Binary to Hexadecimal
- Dot to Run Length Encoding

Designing Compliance Labels

To use a graphic packet to design your compliance label:

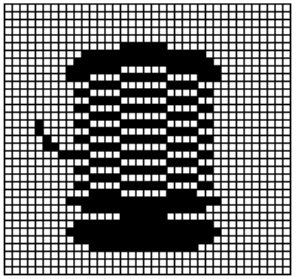
1. Decide which fields are fixed (constant text, lines, boxes) and which fields are variable (addresses and shipping information).

2. Lay out your compliance label as you would any other format. Refer to Chapter 3, “Creating a Graphic Packet,” for more information.

Designing Bitmapped Images

Once you determine the encoding method to use, you can begin mapping out your graphic image.

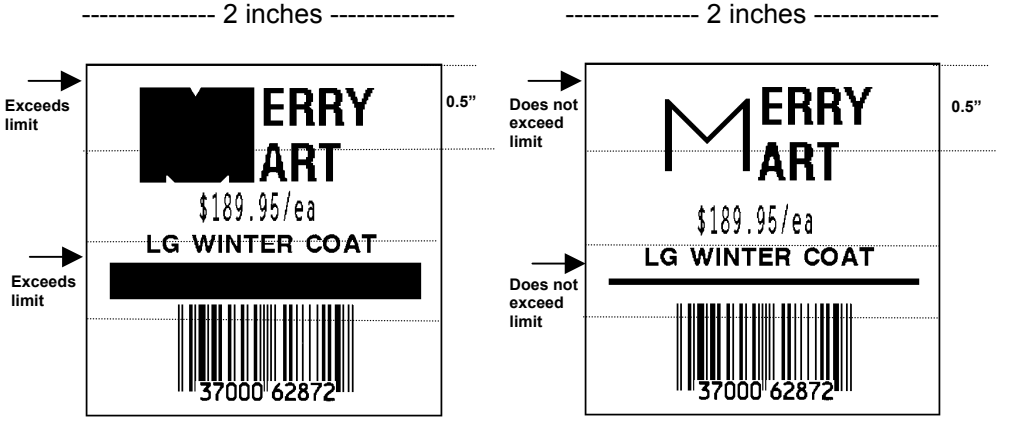
NOTE: The image that you map must be an upside down mirror image of the final result.



Special Considerations

Solid black print cannot exceed 20% (for the 9490™/ 9494™ printers) or 30% (for the 9446™/ 1460™/ 6030™ printers) of any given square inch of the supply. If your black print exceeds this limit, you may lose data or damage the printer.

In the first label, the large “M” logo and thick black line exceed the allowed black to white print ratio. In the second label, the large “M” logo does not exceed the black to white print ratio.

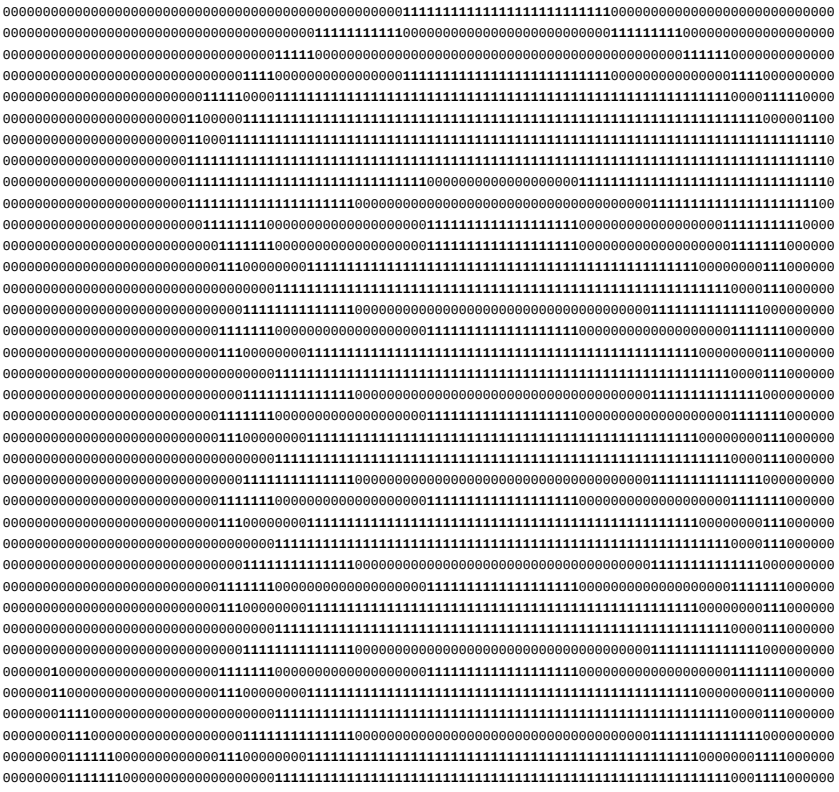


Using the Hexadecimal Method

The following steps explain how to derive a Hexadecimal character string from a bitmapped graphic.

Each square on the grid represents a dot. A black square indicates the dot is ON, and a white square indicates the dot is OFF. A sequence of Binary numbers, called a bit pattern or bitmap, determines what dots are on and off. The numbers "0" and "1" are used for this purpose. The number "1" turns a dot on and "0" turns a dot off.

1. Assign **1** to every black square and **0** to every white square.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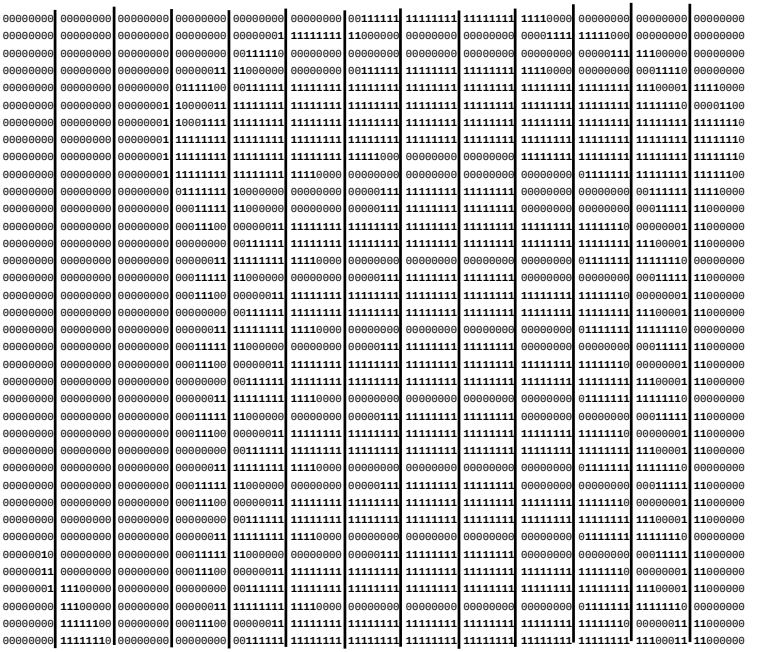
2. Section off the grid in columns of eight. If any rows are not divisible by 8, add enough 0's to complete a column.



3. One row at a time, convert each group of eight Binary digits to Hexadecimal values, using the Binary to Hex Conversion Chart.

```
starting at position 49 ...
00111111 = 3F
11111111 = FF
11111111 = FF
11110000 = F0
```

4. Write the Hexadecimal values for each row as a continuous string.

```
row 1, position 49 = 03FFFFFF00000
```

NOTE: All Hex numbers must be two digits. For example, write Hex 0 as 00, or Hex E as 0E.

5. Repeat steps **3** through **4** for each row on the grid.

6. Insert the Hexadecimal values in syntax format as shown in Chapter 3, “Creating a Graphic Packet.”

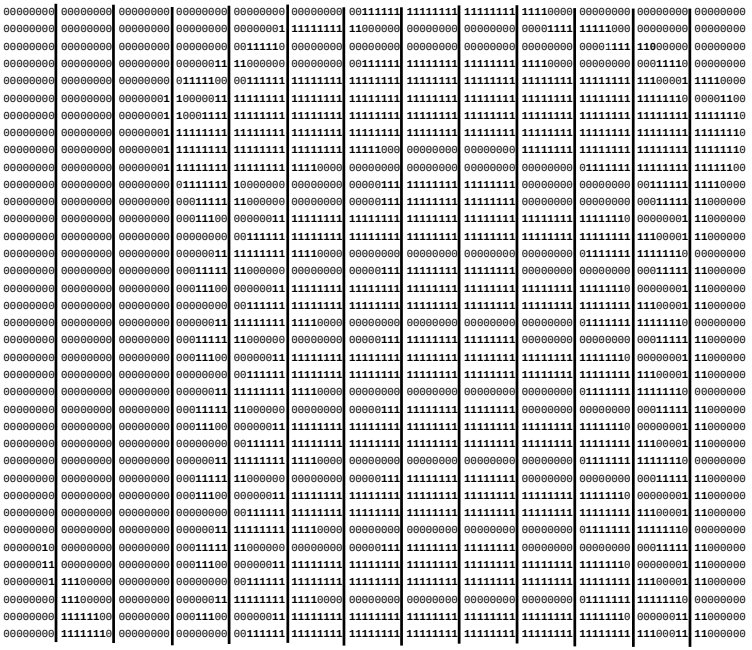
A sample Hex Graphic Packet is also shown in Chapter 3.

Using the Run Length Encoding Method

The following steps explain how to derive a Run Length character string from a bitmapped graphic.

Each square on the grid represents a dot. A black square indicates the dot is ON, and a white square indicates the dot is OFF.

NOTE: For visual clarity, the following example shows "1" to indicate when a square is ON, and "0" to indicate when a square is OFF. You do not have to convert your dots when using the Run Length method.



1. Count the number of consecutive OFF or ON dots in a row. Write the number of consecutive dots in sequence for the first row on the grid. Write "ON" or "OFF" after each number to indicate ON or OFF dots.

```
(row 1, position 50) 26 on
(row 2, position 39) 11 on, 26 off, 9 on
(row 3, position 34) 5 on, 45 off, 6 on
.
.
```

2. Replace each number you have written with its corresponding code from the Dot to Run Length Encoding Chart provided in Appendix A, "Conversion Charts." Be sure to use CAPITAL letters for black dots and lowercase letters for white dots.

```
26 on (Z)
11 on (K), 26 off (z), 9 on (I)
.
.
```

If the number is greater than 26, write z, followed by the letter corresponding to the amount over 26. For example, to represent 45 off dots, write zs.

```
5 on (E), 45 off (zs), 6 on (F)
.
.
```

3. Write the letter codes in sequence, uninterrupted, for each row.

```
(row 1,position 50) Z
(row 2,position 39) KzI
(row 3,position 34) EzsF
(row 4,position 30) DpZoD
.
.
```

NOTE: If the end of the line specifies OFF dots (lowercase letters), the ending lowercase letters can be omitted. For example, uZFu can be written as uZF.

4. Repeat steps **1** through **5** for each row on the grid.

5. Insert the code values using the syntax shown in Chapter 3, "Creating a Graphic Packet."

A sample Run Length Graphic Packet is also shown in Chapter 3.

Determining How to Store the Image

Once you have mapped out your graphic image, determine how you want to store it. You have two options:

- RAM
- Temporary Storage

Using RAM

You should use RAM when the graphic image is used by several formats, because you only have to send the graphic image once. This eliminates the need to send the graphic image repeatedly. Refer to Chapter 4, "Placing the Graphic in a Format," for more information about calling the graphic packet in a format. Graphics smaller than approximately 1/2 inch by 1/2 inch can be stored in printer RAM and referenced by the graphic ID number.

NOTE: Graphics are stored in the format buffer and remain there until another graphic packet is sent or the printer is turned off.

To determine if you have enough room to store the graphic image in RAM:

1. Determine the file size of your graphic image with this formula:

   `(# of rows) x (16 + (`*`width`*`/4)) + 35 / 1024`

   NOTE: *Width* is the width of your graphic image in dots.

   For example, if your graphic image was a 1/2 inch by a 1/2 inch, your file size would be approximately 4 bytes.

   NOTE: The above calculation is an estimate of your file size. Be sure to round up to the nearest 1/2K, because memory is allocated in 1/2K increments.

2. If the size of the graphic image is greater than the amount of available memory in RAM, you must send the graphic image to temporary storage, or reallocate memory. For information on reallocating memory, refer to your printer's *Packet Reference Manual.*

   NOTE: Large graphics require large amounts of memory space in RAM and can quickly use up space.

Using Temporary Storage

You should use temporary storage when the graphic image is used only in one format or your graphic image is very large. *Graphic data in temporary storage is held in the image buffer until the graphic is printed and then it is cleared from memory.* Temporary graphics are also cleared from memory when you send a new batch or update batch. You can use the same graphic image multiple times on a format. Send the graphic image to the printer *after* the format to which it applies.

NOTE: If a graphic is stored in temporary storage, do **not** place a graphic field in the format as described in "Placing the Graphic in a Format." This will cause an error. Instead, position the graphic image by using the *row* and *column* locations in the Graphic Packet Header.

Image memory (temporary storage) will accept a graphic packet with the dimensions listed in the table below.

Rows long	Dots per row	Printer
1152	768	9490/9494
1536	768	9446/1460
701	352	6030

NOTE: You cannot create a graphic image larger than the length of your supply without reallocating memory. Refer to your printer's *Packet Reference Manual* for information on reallocating memory.

Chapter 3. Creating a Graphic Packet

Your graphic packet can contain:

- bitmapped fields (for bitmapped images)
- constant text fields
- lines
- boxes

Images using Hex Representation or Run Length Encoding are bitmapped images. Refer to Chapter 2, "Designing the Graphic Image," to map out your bitmapped image.

Once you lay out your graphic image, you are ready to define a graphic packet. This packet generates the graphic image that you use in a format.

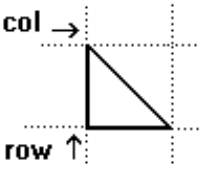
Positioning the Graphic Image

This section explains how to position the graphic image

- within a graphic packet header.
- within a field of a graphic packet.
- within a format.

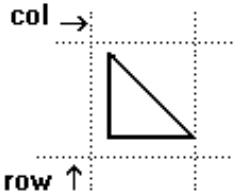
Within the Graphic Packet Header

When you are using RAM, the *row* and *column* parameters in the Graphic Header are usually **0,0**, because placement is controlled by the Graphic Field in your Format. This is especially true when designing a compliance label overlay.



When you are using temporary storage, these parameters control the placement of the graphic image on the supply.

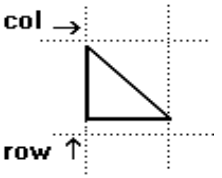
NOTE: The area enclosed within the dotted lines represents the graphic image starting at **0,0** (as defined in the Graphic Header).



If you want a fixed amount of white space around your graphic image, use something other than **0** for *row* and/ or *column*.

NOTE: The area enclosed within the dotted lines represents the graphic image starting at **0,0** with a fixed amount of white space (**10,10**) around the graphic image.

Within the Field



The *row* and *column* parameters in a Bitmap, Constant Text, Line, or Box Field control where an individual field or bitmapped row begins in relation to the coordinates defined in the Graphic Header.

NOTE: The bottom of the triangle in this example represents the first field of the graphic packet starting at **10,0.**

Within a Format

When you define the Graphic Field within your format, the *row* and *column* parameters represent where on the **format** to place the graphic image.

If you are doing a compliance label, these numbers are usually **0,0**, because your compliance label covers the entire supply. Refer to Chapter 4, “Placing the Graphic in a Format,” for a sample compliance label.

If you are placing a graphic (a logo, for example) within a certain area on your supply, enter the starting position (bottom left corner) of the graphic image.

NOTE: This label shows the triangle “logo” beginning (the bottom left corner) at 400,75 as defined in the Graphic Field.

Graphic Header

Every graphic packet must contain a Graphic Header. This is the first thing you enter. It identifies and provides important measurement and formatting information for the graphic. Bitmap, duplicate, next-bitmap, constant text, line, and box fields follow the Graphic Header, if they are used.

G1 HEADER	G2 GRAPH ID	G3 ACTION	G4 DEVICE	G5 UNITS	G6 ROW	G7 COLUMN	G8 MODE	G9 NAME
G	**A**			**0**				

Syntax `{G,graphID,action,device,units,row,col,mode,"name"¦`

{ Start of packet for MPCL file.

G Identifies a graphic packet.

graphID A number from **1** to **999** to identify the graphic image.

action Enter **A** to add the packet to printer memory.

device Printer device that stores the graphic.

- **R** Volatile RAM (format must contain a Graphic Field).
- **T** Temporary storage.

NOTE: Graphics require a lot of RAM and can quickly use up space. When using graphics larger than 1/2 inch by 1/2 inch, temporary storage is recommended.

units Unit of measure for graphic fields. All units used in the Graphic Packet must use the units selected here.

- **E** English. Measured in 1/100 inches.
- **M** Metric. Measured in 1/10 millimeters.
- **G** Dots. These printers print 192 dots per inch.

NOTE: For bitmapped graphics, **G** is the only valid option.

row	Distance between the *bottom* of the graphic image area and the first bitmap line. This is usually **0**, unless you want a fixed amount of white space around the graphic image. Refer to "Positioning the Graphic Image," earlier in this chapter for more information. Must be measured in selected units.
col	Distance between the *left edge* of the graphic image area and the left edge of first bitmap line. This is usually **0**, unless you want a fixed amount of white space around the graphic image. Refer to "Positioning the Graphic Image," earlier in this chapter for more information. Must be measured in selected units.
mode	Imaging mode. Enter **0**. This is the only option supported by these printers.
"name"	Assign a name (for reference only) to the graphic. The name must be **1** - **8** characters in length. Enclose in quotation marks (example: "Name").

Example `{G,99,A,R,G,0,0,0,"99Wire"¦`

- Graphic header
- Image is identified by number **99**
- Image being **A**dded
- Image stored in volatile RAM
- Image uses **G**raphic (dot) measurement
- Image will be placed according to the *row* and *column* parameters specified in the Graphic Field within the format.
- Imaging mode is **0**
- Image is called **99Wire**

Bitmap Fields

This defines one row of dots, starting at a specific row and column within the graphic image. Each unique row of dots requires a bitmap field. A bitmap field can later be repeated by using a duplicate field.

Syntax `B,row,column,algorithm,"data"¦`

B Identifies a bitmap field.

row Distance (in dots) from the graphic image's bottom margin to the bitmap line.

Unit of Measure	9490/9494	9446/1460	6030
English	0- 599	0- 799	0- 372
Metric	0- 1521	0- 2033	0- 945
Dots	0- 1151	0- 1536	0- 701

column Distance (in dots) from the graphic image's left edge to the bitmap line.

Unit of Measure	9490/9494/9446/1460	6030
English	0- 399	0- 183
Metric	0- 1015	0- 465
Dots	0- 768	0-352

algorithm Coding method to use for bitmap data.

H Hex Representation
R Run Length Encoding

"data" Character string made up of Hexadecimal or Run Length encoding. Do not put spaces or any other character between the numbers.

Example `B,39,56,H,"3FFFFFF0"¦`

- Bitmapped graphic field
- Image begins **39** dots from the bottom of the graphic area
- Image begins **56** dots from the left edge of the graphic area
- Hex representation is used

Next-Bitmap Fields

This field uses the previous field's *row* and *column* locations. It allows you to use the bitmap or duplicate field data without having to recalculate row and column locations. This field represents one row of dots on the image.

Syntax `N,adjdir,adjamt,algorithm,"data"¦`

N — Identifies a next-bitmap field.

adjdir — Do you want to increment or decrement the row count? (Insert the duplicate line after or before the current row?)

- **0** Increments (Inserts after)
- **1** Decrements (Inserts before)

For example:

```
B,50,35,R,"GsSsG" ¦

N,0,R,"DpZoD"¦
```

prints a next-bitmap field on row **51** at column **35**.

adjamt — Amount of row adjustment in dot rows. Using **0** overwrites the same line.

algorithm — Coding method for bitmap data.

- **H** Hex Representation
- **R** Run Length Encoding

"data" — Character string made up of Hexadecimal or Run Length encoding. Do not put spaces or any other character between the Hex numbers or Run Length code letters.

Example

```
B,39,56,H,"3FFFFFF0"¦
N,0,1,H,"000000E00000"¦
```

- **N**ext-Bitmap graphic field information is printed on row 40 (increments row count)
- Amount of adjustment is **1** row
- Hex representation is used

Duplicate Fields

If a line of data is identical to a previous bitmap or next-bitmap field, the duplicate field allows you to repeat the dot sequence without retyping the data. A duplicate field represents one row of dots on the image.

NOTE: Duplicate fields are useful when you have a graphic with a lot of repetition.

Syntax `D,adjdir,adjamt,count¦`

D — Identifies a duplicate field.

adjdir — Do you want to increment or decrement the row count? (Insert the duplicate line after or before the current row?)

0 Increments (inserts after)
1 Decrements (inserts before)
For example:

```
B,50,35,R,"GsSsG"¦

D,0,20,2¦
```

inserts row 50 again at row 70 and row 90. Rows 70 and 90 do not have to be defined later.

adjamt — Amount of row adjustment in dot rows. The above example adjusts the duplicate field to image on row 70 and 90 (adding 20 to the current row count.)

count — Number of times to duplicate. (How many times do you want to repeat the line?)

Example

```
B,117,24,H,"03FFFFFFFFFFFFFFFFFFC"¦
D,0,1,2¦
```

- Indicates a **d**uplicate field
- Images the duplicate line after (**0**) the bitmap line
- Duplicates the preceding bitmap line twice (at row 118 and 119)

The following fields (constant text, line, and box field) can be used in a graphic packet to create a compliance label overlay.

Constant Text Fields

A constant text field consists of a set of fixed text. Constant text fields can appear either in graphic packets or format packets.

For information on using constant text fields, see "Defining Constant Text Fields" in your printer's *Packet Reference Manual*.

Line Fields

The Line field in a graphic packet is identical to the line field in a format packet. For information on using line fields, see "Defining Line Fields" in your printer's *Packet Reference Manual.*

For information on positioning a line within the graphic image, refer to "Positioning the Graphic Image," earlier in this chapter. Define the *row* and *column* parameters in the units of measure selected in the Graphic Header.

Box Fields

The Box (Quadrilateral) field in a graphic packet is identical to the quadrilateral field in a format packet. For information on using box fields, see "Defining Boxes" in your printer's *Packet Reference Manual.*

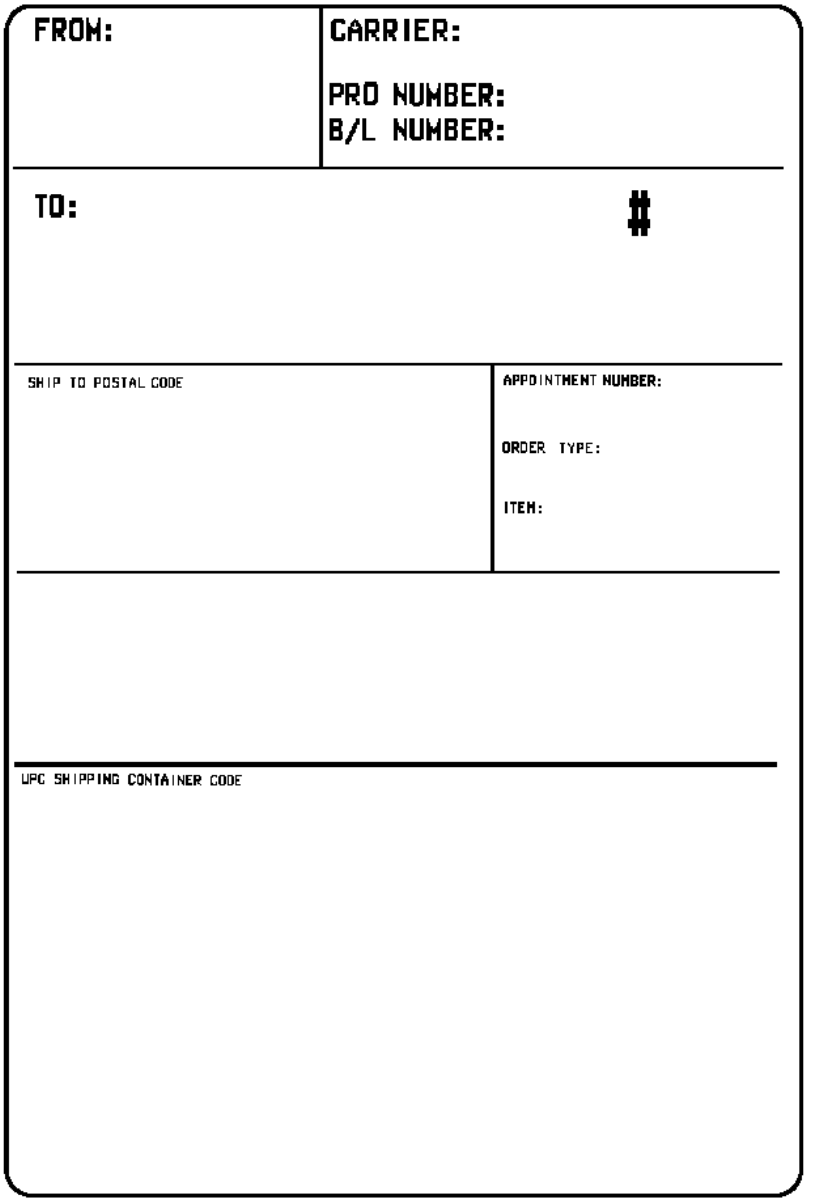
For information on positioning a box within the graphic image, refer to "Positioning the Graphic Image," earlier in this chapter. Define the *row* and *column* parameters in the units of measure selected in the Graphic Header.

Sample Compliance Graphic Packet

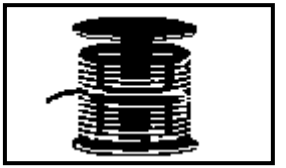
A sample compliance graphic packet is shown below.

```
{                                                    Start of packet
G,57,A,R,E,0,0,0,"OVERLAY"¦                          Graphic Header
L,V,500,155,90,85,3¦                                 Line field
L,V,298,245,90,102,3¦                                Line field
L,V,500,2,0,390,3¦                                   Line field
L,V,400,2,0,390,3¦                                   Line field
L,V,298,2,0,390,3¦                                   Line field
L,V,200,2,0,390,5¦                                   Line field
C,560,10,0,2,2,2,B,L,0,0,"FROM:",0¦                  Constant field
C,560,160,0,2,2,2,B,L,0,0,"CARRIER:",0¦              Constant field
C,529,160,0,2,2,2,B,L,0,0,"PRO NUMBER:",0¦           Constant field
C,511,160,0,2,2,2,B,L,0,0,"B/L NUMBER:",0¦           Constant field
C,472,10,0,2,2,2,B,L,0,0,"TO:",0¦                    Constant field
C,387,10,0,2,1,1,B,L,0,0,"SHIP TO POSTAL CODE",0¦    Constant field
C,391,250,0,2,1,1,B,L,0,0,"APPOINTMENT NUMBER:",0¦   Constant field
C,358,250,0,2,1,1,B,L,0,0,"ORDER TYPE:",0¦           Constant field
C,327,250,0,2,1,1,B,L,0,0,"ITEM:",0¦                 Constant field
C,190,8,0,2,1,1,B,L,0,0,"UPC SHIPPING CONTAINER CODE",0¦ Constant field
C,548,6,0,2,1,1,B,L,0,0,"MONARCH MARKING SYSTEMS",0¦ Constant field
C,538,6,0,2,1,1,B,L,0,0,"170 MONARCH LANE",0¦        Constant field
C,528,6,0,2,1,1,B,L,0,0,"P.O. BOX 608",0¦            Constant field
C,518,6,0,2,1,1,B,L,0,0,"DAYTON, OHIO  45401",0¦     Constant field
C,462,313,0,2,4,3,B,L,0,0,"#",0¦                     Constant field
}                                                    End of packet
```

The sample compliance label overlay on the following page was created with this packet, using the format provided in Chapter 4, “Placing the Graphic in a Format.”


FROM:
CARRIER:
PRO NUMBER:
B/L NUMBER:
TO:
#
SHIP TO POSTAL CODE
APPOINTMENT NUMBER:
ORDER TYPE:
ITEM:
UPC SHIPPING CONTAINER CODE

Sample Hex Graphic Packet

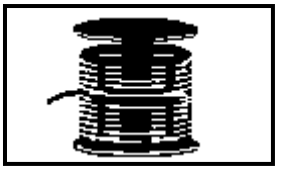


```
{G,99,A,R,G,0,0,0,"99WIRE"¦
B,39,48,H,"3FFFFFF0"¦
B,40,32,H,"01FFC000000FF8"¦
B,41,32,H,"3E00000000000FC0"¦
B,42,24,H,"03C0003FFFFFF0000F"¦
B,43,24,H,"7C3FFFFFFFFFFFFE1F0"¦
B,44,16,H,"0183FFFFFFFFFFFFFF06"¦
B,45,16,H,"018FFFFFFFFFFFFFFFFE"¦
B,46,16,H,"01FFFFFFFFFFFFFFFFFE"¦
B,47,16,H,"01FFFFFF80001FFFFFFFE"¦
B,48,16,H,"01FFFFF0000000007FFFFC"¦
B,49,24,H,"7F800007FFFF00003FF0"¦
B,50,24,H,"1FC00007FFFF00001FC0"¦
D,0,4,4¦
B,51,24,H,"1C03FFFFFFFFFFE01C0"¦
D,0,4,4¦
B,52,32,H,"3FFFFFFFFFFFFE1C0"¦
D,0,4,4¦
B,53,24,H,"03FFF0000000007FFE"¦
D,0,4,4¦
B,70,0,H,"0400001FC00007FFFF00001FC0"¦
B,71,0,H,"0600001C03FFFFFFFFFFE01C0"¦
B,72,0,H,"030000003FFFFFFFFFFFFE1C0"¦
B,73,0,H,"01000003FFF0000000007FFE"¦
B,74,8,H,"FC001C03FFFFFFFFFFFE00C0"¦
B,75,8,H,"FE00003FFFFFFFFFFFFE0C0"¦
B,76,8,H,"1FF803FFF0000000007FFE"¦
B,77,8,H,"0FFFCFFC00000000000001C0"¦
B,78,16,H,"FFDF000FFFFFFFFF8003C0"¦
B,79,16,H,"7FFFC00007FFFF00001FC0"¦
B,80,24,H,"1C03FFFFFFFFFFE01C0"¦
D,0,4,4¦
B,81,32,H,"3FFFFFFFFFFFFE1C0"¦
D,0,4,4¦
B,82,24,H,"03FFF0000000007FFE"¦
D,0,4,3¦
B,83,24,H,"1FC00007FFFF00001FC0"¦
D,0,4,3¦
```

Sample Hex Graphic Packet (continued)

```
B,98,24,H,"03FFFFFFFFFFFFFF0"¦
B,99,24,H,"07FFFFFFFFFFFFFC"¦
B,100,24,H,"1FF9FFFFFFFFFFFF"¦
B,101,24,H,"3FFE0007FFFF8000FF80"¦
B,102,24,H,"391E0027FFFF803FFFC0"¦
B,103,24,H,"1C7FFFFFFFFFFFFFC0"¦
B,104,24,H,"1FC1FFFFFFFFFF1FC0"¦
B,105,24,H,"0FFDFFFFFFFFFE0FF"¦
B,106,24,H,"FFFFFFFFFFFFFF8"¦
B,107,32,H,"3FFFFFFFFFFFFE0"¦
B,108,32,H,"03FFFFFFFFFF"¦
B,109,48,H,"07FFFF80"¦
D,0,1,2¦
B,111,48,H,"FFFFFFFF"¦
B,112,32,H,"FFFF00000000FFE0"¦
B,113,24,H,"078000FFFFFFFF001F"¦
B,114,24,H,"78FFFFFFFFFFFFFE060"¦
B,115,16,H,"0187FFFFFFFFFFFFFC18"¦
B,116,16,H,"027FFFFFFFFFFFFFFFF2"¦
B,117,16,H,"03FFFFFFFFFFFFFFFFFC"¦
D,0,1,2¦
B,120,16,H,"01FFFFFFFFFFFFFFFFF8"¦
B,121,24,H,"FEFFFFFFFFFFFFFFFE0"¦
B,122,24,H,"07FFFFFFFFFFFFFFC"¦
B,123,32,H,"FFFFFFFFFFFFFC0"¦
B,124,32,H,"01FFFFFFFFFF8"¦}
```

Sample Run Length Graphic Packet



```
{G,99,A,R,G,0,0,0,"99WIRE"¦
B,39,50,R,"Z"¦
B,40,39,R,"KzI"¦
B,41,34,R,"EzsF"¦
B,42,30,R,"DpZoD"¦
B,43,25,R,"EdZZEdE"¦
B,44,23,R,"BeZZMeB"¦
B,45,23,R,"BcZZW"¦
B,46,23,R,"ZZZA"¦
B,47,23,R,"ZDsZE"¦
B,48,24,"TzkU"¦
B,49,25,"HtRqJ"¦
B,50,27,"GsSsG"¦
D,0,4,4¦
B,51,27,"ChZWgC"¦
D,0,4,4¦
B,52,34,R,"ZZEdC"¦
D,0,4,4¦
B,53,30,R,"NzkN"¦
D,0,4,4¦
B,70,5,R,"AuGsSsG"¦
B,71,5,R,"BtChZWgC"¦
B,72,6,R,"DxZZEdC"¦
B,73,7,R,"CtNzkN"¦
B,74,8,R,"FmChZWhC"¦
B,75,8,R,"GsZZEdC"¦
B,76,11,R,"JiNzkN"¦
B,77,12,R,"NbJzzeC"¦
B,78,16,R,"JaElZKmD"¦
B,79,17,R,"QsSsG"¦
B,80,27,R,"ChZWgC"¦
D,0,4,4¦
B,81,34,R,"ZZEdC"¦
D,0,4,4¦
B,82,30,R,"NzkN"¦
D,0,4,4¦
B,83,27,R,"GsSsG"¦
D,0,4,4¦
```

Sample Run Length Graphic Packet (continued)

```
B,98,30,R,"ZZJ"¦
B,99,29,R,"ZZM"¦
B,100,27,R,"JbZZE"¦
B,101,26,R,"MnToI"¦
B,102,26,R,"CbHnTiP"¦
B,103,27,R,"CcZZC"¦
B,104,27,R,"GeZWcG"¦
B,105,28,R,"JaZReH"¦
B,106,32,R,"ZZI"¦
B,107,34,R,"ZZE"¦
B,108,38,R,"ZQ"¦B,109,53,R,"T"¦
D,0,1,2¦
B,111,48,R,"ZF"¦
B,112,33,R,"PzfK"¦
B,113,29,R,"CpZBoE"¦
B,114,25,R,"DcZZGfB"¦
B,115,23,R,"BdZZMeB"¦
B,116,22,R,"AbZZVbA"¦
B,117,22,R,"ZZZB"¦
D,0,1,2¦
B,120,23,R,"ZZZ"¦
B,121,25,R,"ZZV"¦
B,122,29,R,"ZZM"¦
B,123,32,R,"ZZF"¦
B,124,39,R,"ZT"¦}
```

Chapter 4. Placing the Graphic in a Format

The graphic image may be a bitmapped graphic or a compliance label overlay.

To include a graphic within a format:

1. Design the graphic image as shown in Chapter 2, “Designing the Graphic Image.”
2. If you are using RAM, place a Graphic Field in the format file to reference the graphic. Refer to the following section, “Including the Graphic Field,” for more information.

   NOTE: If you are using temporary storage, you do not need a Graphic Field in your format to reference the graphic image.

3. Download all the necessary packets (check digit, format, etc.).

   NOTE: If you are using the 6030 printer, you must define a script instead of a batch.

4. Send the graphic file to the printer, if you have not already done so. Refer to Chapter 3, “Creating a Graphic Packet,” for more information.

Including the Graphic Field

The Graphic Field in a format references the graphic image by the *GraphID* in the Graphic Header.

NOTE: This field is required only if the graphic will be stored in RAM.

G1 HEADER	G2 GRAPH ID	G3 ROW	G4 COLUMN	G5 MODE	G6 ROTATION
G				**0**	**0**

Syntax `G,graphID,row,col,mode,rotation¦`

G Identifies a graphic field within a format.

graphID The GraphID number (**1** to **999)** of the graphic packet. Matches the GraphID in the Graphic Header.

row Distance from the *bottom* of the print area on the supply to the bottom of the graphic image. Use the units of measure specified in the Format Header.

Unit of Measure	9490/9494	9446/1460	6030
English	0- 599	0- 799	0- 372
Metric	0- 1521	0- 2033	0- 945
Dots	0- 1151	0- 1536	0- 701

NOTE: The row specified in the Constant Text, Bitmap, Line, or Box field is added to the *row* value above to determine the actual position in the format.

col Distance between the *left edge* of the print area on the supply and the left edge of the graphic. Use the units of measure specified in the Format Header.

Unit of Measure	9490/9494/9446/1460	6030
English	0- 399	0- 183
Metric	0- 1015	0- 465
Dots	0- 768	0- 352

NOTE: The column specified in the Constant Text, Bitmap, Line, or Box field is added to the *col* value above to determine the actual position in the format.

mode Imaging mode. Enter **0**. This is the only option supported by these printers.

rotation The orientation of the graphic on the supply. Only **0** is supported by these printers.

Example `{G,57,0,0,0,0¦}`

- Graphic field
- Image is identified by number **57**
- Image begins at **0,0**
- Imaging mode is **0**
- Rotation is **0**

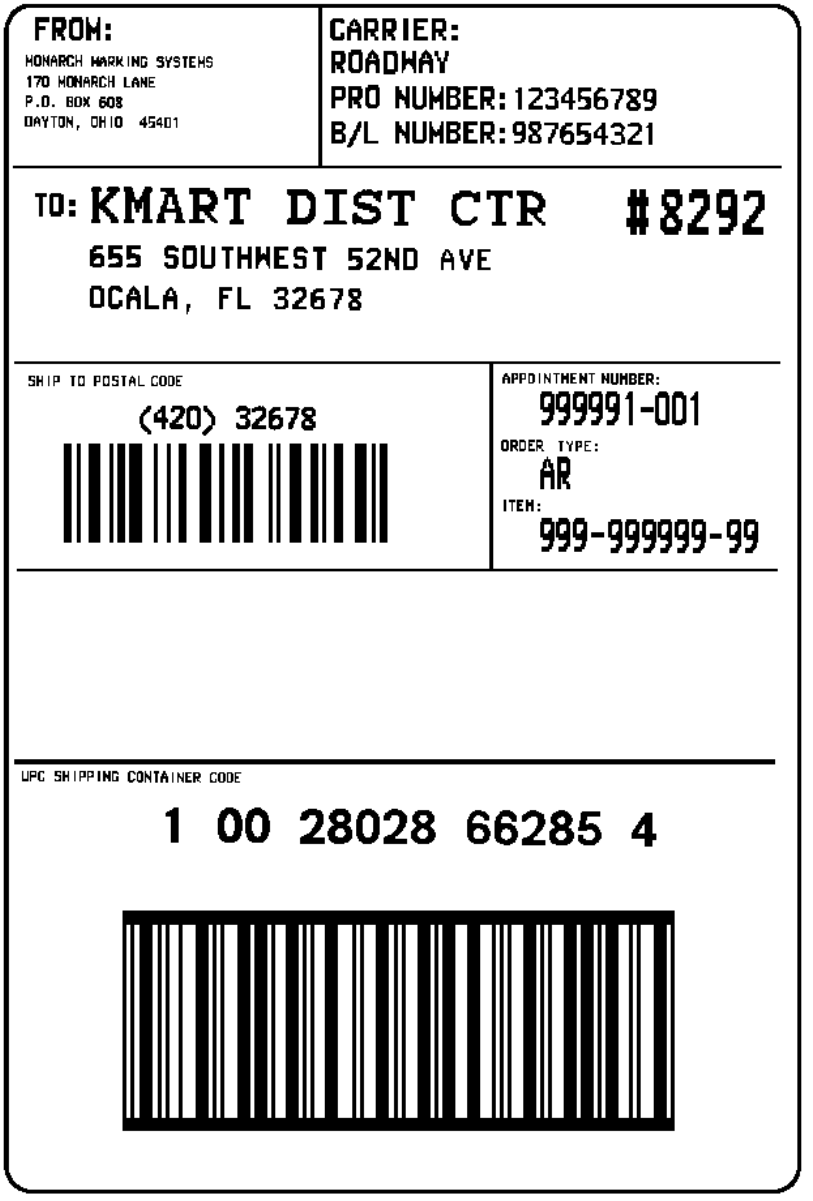
Sample Compliance Label

This sample format packet calls the graphic packet in Chapter 3, “Creating a Graphic Packet.”

```
{F,1,A,R,E,600,400,"RDCI"¦                Format Header
G,57,0,0,0,0¦ Call Graphic packet
T,1,15,V,529,252,0,2,2,2,B,L,0,0,0¦       Text field
T,2,15,V,511,252,0,2,2,2,B,L,0,0,0¦       Text field
B,3,13,V,311,28,8,4,50,8,L,0¦             Bar code field
B,4,14,V,17,60,50,5,110,8,L,0¦            Bar code field
T,5,30,V,161,080,0,3,1,1,B,L,0,0,0¦       Text field
T,6,15,V,467,40,4,1,2,2,B,L,0,0,0¦        Text field
T,7,10,V,462,330,6,2,4,3,B,L,0,0,0¦       Text field
T,8,20,V,545,160,0,2,2,2,B,L,0,0,0¦       Text field
T,9,30,V,446,40,4,2,2,2,B,L,0,0,0¦        Text field
T,10,30,V,426,40,4,2,2,2,B,L,0,0,0¦       Text field
T,11,30,V,406,40,4,2,2,2,B,L,0,0,0¦       Text field
T,12,20,V,368,270,0,2,3,2,B,L,0,0,0¦      Text field
T,13,5,V,335,270,0,2,3,2,B,L,0,0,0¦       Text field
T,14,15,V,304,270,0,2,3,2,B,L,0,0,0¦      Text field
T,15,15,V,366,65,0,2,2,2,B,L,0,0,0¦       Text field
R,1,"(420) "¦}                            Option 1

{B,1,N,1¦
1,"123456789"¦
2,"987654321"¦
3,"42032678"¦
4,"10028028662854"¦
5,"1 00 28028 66285 4"¦
6,"KMART DIST CTR"¦
7,"8292"¦
8,"ROADWAY"¦
9,"655 SOUTHWEST 52ND AVE"¦
10,"OCALA, FL 32678"¦
11," "¦
12,"999991-001"¦
13,"AR"¦
14,"999-999999-99"¦
15,"32678"¦}
```

The compliance label on the following page was created with this format.



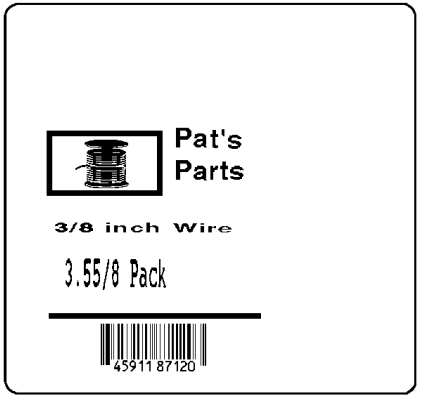
NOTE: This is not an approved Kmart Compliance Label.

Sample Bitmap Graphic Image

The following format shows the graphic packets (Hex and Run Length) in a sample format.

```
{F,2,A,R,E,400,400,"FMT2"¦              Format Header
G,99,227,35,0,0¦                        Call graphic packet
Q,240,15,300,125,10," "¦                Box field
T,1,5,V,285,137,0,10,2,2,B,L,0,0,0¦     Text field
T,2,5,V,255,137,0,10,2,2,B,L,0,0,0¦     Text field
T,3,15,V,180,25,0,10,1,2,B,L,0,0,0¦     Text field
T,4,15,V,121,35,0,1,3,1,B,L,0,0,0¦      Text field
L,S,94,15,94,235,10," "¦                Line field
B,5,12,F,50,65,1,2,40,1,L,0¦}           Bar code field

{B,2,N,1¦
1,"Pat's"¦
2,"Parts"¦
3,"3/8 inch Wire"¦
4,"3.55/8 Pack"¦
5,"345911871209"¦}
```



Appendix A. Conversion Charts

Use the charts in this appendix to convert dot sequences from the image dot pattern to codes you can use in the fields.

Use the Binary to Hex Conversion Chart to convert Binary dot sequences to Hexadecimal numbers for bitmap files.

Use the Dot to Run Length Encoding Chart to convert dot sequences to alphabetic characters for bitmap files.

Binary to Hex Conversion Chart

Binary	Hex	Binary	Hex
00000000	00	00100000	20
00000001	01	00100001	21
00000010	02	00100010	22
00000011	03	00100011	23
00000100	04	00100100	24
00000101	05	00100101	25
00000110	06	00100110	26
00000111	07	00100111	27
00001000	08	00101000	28
00001001	09	00101001	29
00001010	0A	00101010	2A
00001011	0B	00101011	2B
00001100	0C	00101100	2C
00001101	0D	00101101	2D
00001110	0E	00101110	2E
00001111	0F	00101111	2F
00010000	10	00110000	30
00010001	11	00110001	31
00010010	12	00110010	32
00010011	13	00110011	33
00010100	14	00110100	34
00010101	15	00110101	35
00010110	16	00110110	36
00010111	17	00110111	37
00011000	18	00111000	38
00011001	19	00111001	39
00011010	1A	00111010	3A
00011011	1B	00111011	3B
00011100	1C	00111100	3C
00011101	1D	00111101	3D
00011110	1E	00111110	3E
00011111	1F	00111111	3F

Binary to Hex Conversion Chart (continued)

Binary	Hex	Binary	Hex
01000000	40	01100000	60
01000001	41	01100001	61
01000010	42	01100010	62
01000011	43	01100011	63
01000100	44	01100100	64
01000101	45	01100101	65
01000110	46	01100110	66
01000111	47	01100111	67
01001000	48	01101000	68
01001001	49	01101001	69
01001010	4A	01101010	6A
01001011	4B	01101011	6B
01001100	4C	01101100	6C
01001101	4D	01101101	6D
01001110	4E	01101110	6E
01001111	4F	01101111	6F
01010000	50	01110000	70
01010001	51	01110001	71
01010010	52	01110010	72
01010011	53	01110011	73
01010100	54	01110100	74
01010101	55	01110101	75
01010110	56	01110110	76
01010111	57	01110111	77
01011000	58	01110111	78
01011001	59	01111001	79
01011010	5A	01111010	7A
01011011	5B	01111011	7B
01011100	5C	01111100	7C
01011101	5D	01111101	7D
01011110	5E	01111110	7E
01011111	5F	01111111	7F

Binary to Hex Conversion Chart (continued)

Binary	Hex	Binary	Hex
10000000	80	10100000	A0
10000001	81	10100001	A1
10000010	82	10100010	A2
10000011	83	10100011	A3
10000100	84	10100100	A4
10000101	85	10100101	A5
10000110	86	10100110	A6
10000111	87	10100111	A7
10001000	88	10101000	A8
10001001	89	10101001	A9
10001010	8A	10101010	AA
10001011	8B	10101011	AB
10001100	8C	10101100	AC
10001101	8D	10101101	AD
10001110	8E	10101110	AE
10001111	8F	10101111	AF
10010000	90	10110000	B0
10010001	91	10110001	B1
10010010	92	10110010	B2
10010011	93	10110011	B3
10010100	94	10110100	B4
10010101	95	10110101	B5
10010110	96	10110110	B6
10010111	97	10110111	B7
10011000	98	10111000	B8
10011001	99	10111001	B9
10011010	9A	10111010	BA
10011011	9B	10111011	BB
10011100	9C	10111100	BC
10011101	9D	10111101	BD
10011110	9E	10111110	BC
10011111	9F	10111111	BF

Binary to Hex Conversion Chart (continued)

Binary	Hex	Binary	Hex
11000000	C0	11100000	E0
11000001	C1	11100001	E1
11000010	C2	11100010	E2
11000011	C3	11100011	E3
11000100	C4	11100100	E4
11000101	C5	11100101	E5
11000110	C6	11100110	E6
11000111	C7	11100111	E7
11001000	C8	11101000	E8
11001001	C9	11101001	E9
11001010	CA	11101010	EA
11001011	CB	11101011	EB
11001100	CC	11101100	EC
11001101	CD	11101101	ED
11001110	CE	11101110	EE
11001111	CF	11101111	EF
11010000	D0	11110000	F0
11010001	D1	11110001	F1
11010010	D2	11110010	F2
11010011	D3	11110011	F3
11010100	D4	11110100	F4
11010101	D5	11110101	F5
11010110	D6	11110110	F6
11010111	D7	11110111	F7
11011000	D8	11111000	F8
11011001	D9	11111001	F9
11011010	DA	11111010	FA
11011011	DB	11111011	FB
11011100	DC	11111100	FC
11011101	DD	11111101	FD
11011110	DE	11111110	FE
11011111	DF	11111111	FF

Dot to Run Length Encoding Chart

ON (Black) Dots			
# of Dots	**Code**	**# of Dots**	**Code**
1	A	14	N
2	B	15	O
3	C	16	P
4	D	17	Q
5	E	18	R
6	F	19	S
7	G	20	T
8	H	21	U
9	I	22	V
10	J	23	W
11	K	24	X
12	L	25	Y
13	M	26	Z

OFF (White) Dots			
# of Dots	**Code**	**# of Dots**	**Code**
1	a	14	n
2	b	15	o
3	c	16	p
4	d	17	q
5	e	18	r
6	f	19	s
7	g	20	t
8	h	21	u
9	i	22	v
10	j	23	w
11	k	24	x
12	l	25	y
13	m	26	z

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